LOW K AND ULTRA LOW K SiCOH DIELECTRIC FILMS AND METHODS TO FORM THE SAME

ABSTRACT OF THE DISCLOSURE

Dielectric materials including elements of Si, C, O and H having specific values of mechanical properties (tensile stress, elastic modulus, hardness cohesive strength, crack velocity in water) that result in a stable ultra low k film which is not degraded by water vapor or integration processing are provided. The dielectric materials have a dielectric constant of about 2.8 or less, a tensile stress of less than 45 MPa, an elastic modulus from about 2 to about 15 GPa, and a hardness from about 0.2 to about 2 GPa. Electronic structures including the dielectric materials of the present invention as well as various methods of fabricating the dielectric materials are also provided.